Sources and Methods
for the
Quarterly Estimates
of
State Personal Income

The estimates of state personal income and its components measure and track the levels and types of income that are received by the people who live and work in each of the states and the District of Columbia. The estimates begin with the first quarter of 1969.

The quarterly estimates are tied to the annual state estimates, which incorporate more detailed and more reliable source data than the quarterly estimates. The quarterly estimates of all the components of state personal income are based on the growth rates of the quarterly state source data that are controlled to the annual estimates in the national income and product accounts (NIPAs).

The quarterly estimates are presented seasonally adjusted at annual rates./1/ After seasonal adjustment, cyclical and other short-term changes in the states' economies stand out more clearly. The quarterly estimates are presented at annual rates so that the quarterly and the annual estimates may easily be compared. For some components, the quarterly source data used to prepare the estimates are seasonally adjusted at the detailed series level when statistically significant seasonal patterns are present in the data. For other components, typically those that are insensitive to short-term changes in state-level economic conditions, the seasonally adjusted state estimates are derived from the seasonally adjusted national estimates and from the trend in the annual state estimates./2/

State-level source data and methods

Quarterly source data for many components of state personal income are either unavailable or are less reliable or comprehensive than the annual data.

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1. See "Seasonal adjustment" and "Annual rates" in the "Glossary."
2. For personal interest income, for example, the quarterly fluctuations mainly result from changes in interest rates, which do not vary greatly among the states.

The estimates for the quarters of years for which annual estimates have been prepared are interpolated from the annual estimates; the estimates for the quarters of the year or years for which annual estimates have not yet been prepared--the "preliminary" and "second quarterly" estimates--are extrapolated from the most recent annual estimates./3/

The quarterly estimates and the annual estimates are revised on a regular schedule to incorporate source data that are more complete, more detailed, or otherwise more appropriate than the data that were available when the estimates were initially prepared./4/

The "preliminary" quarterly estimates for a quarter are prepared 3 months after the end of the quarter. The "second" estimates for the quarter are prepared 3 months later. The second estimates for the quarters of a year, along with the "revised" quarterly estimates for the preceding 2 years, are revised in September of the following year and in the following March, so that they will be consistent with the revised annual estimates. (See table I and also "Preparation and revision schedule" in the "Introduction.") In addition, the second estimates for some

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3. Two interpolation techniques are used: One uses seasonally adjusted monthly or quarterly source data as the indicator series, and the other uses an indicator series generated from the relationship between the estimates for each state and for the Nation in the annual series. For the latter technique, the indicators are derived in part from a regression analysis that relates the annual estimates for the state to the corresponding national estimates for a 7-year period. For the latest 3 years, regression analysis for the latest 7-year period is used; for each of the earlier years, regression analysis of the 7-year period centered on the year is used. The regression equation is

$$X_S^t = a + bY_N^t$$

where X_S^t is the regression-estimated value for state S for year t, Y_N^t is the national estimate for year t, and a and b are the constant and the coefficient derived from the regression analysis. Also used in the derivation of the indicator series is r^2, the square of the coefficient of correlation from the regression analysis. The state indicators for each quarter q in *year t* are generated by solving

$$X_S^q = r^2 \left(a + bY_N^q \right) + \left(1 - r^2 \right) \left(\frac{Y_S^t}{Y_N^t} Y_N^q \right)$$

where X_S^q is the state indicator, y_S^t is the state estimate for *year t*, and Y_N^q is the national estimate for quarter q. Two extrapolation techniques are used: One uses the seasonally adjusted monthly or quarterly source data as the indicator series, and the other uses the past trends in the annual series by solving the equation used for the last 3 years of the interpolated series with the state and national estimates for the last year of the annual series and the national estimate for each quarter of the extrapolated series.

4. See "Availability of the state estimates" in the "Introduction."

quarters may be revised one or more times before the detailed annual estimates are available. However, the quarterly estimates for a year are not classified as "revised" until they have been adjusted for consistency with annual estimates for that year./5/

The preliminary, second, and revised quarterly estimates are prepared in three steps. First, quarterly indicator series are prepared for the components for which state-level quarterly or monthly source data are available. Second, initial approximations of the quarterly estimates are prepared by interpolating and extrapolating the annual estimates with the indicator series or according to the trend in the annual estimates (see footnote 3). Third, the initial approximations are used to allocate the national control totals to states.

Preliminary and second quarterly estimates.--The preliminary and second state quarterly estimates are prepared with the indicator series shown in table J. Little direct source data are available for the preliminary state quarterly estimates. However, the estimates of most of the components of wages and salaries, are prepared using a sample of employment from the Current Employment Statistics (CES) survey from the Bureau of Labor Statistics (BLS). The CES is a survey that collects monthly employment data from a sample of about 400,000 nonagricultural establishments across the United States. The Survey is conducted for the pay period that includes the 12th of each month and is benchmarked annually to the Covered Employment and Wage employment data also from BLS. The CES monthly employment data is averaged to quarters and seasonally adjusted at the NAICS sector level by BEA.

The second state quarterly estimates of wages and salaries for most components of Personal Income are based on quarterly administrative record data from the Covered Employment and Wage (CEW) program from BLS. The CEW is a nearly complete census of wages and includes exercised stock options and other lump-sum payments that are not captured in the CES employment data. The wage data is summed to quarterly totals and seasonally adjusted by BEA at the NAICS sector level.

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5. For additional information, see Robert L. Brown and James P. Stehle, "Evaluation of the State Personal Income Estimates," Survey of Current Business 70 (December 1990): 20-29.

The estimates of wages and salaries are used to produce the quarterly estimates of supplements to wages and salaries-which includes employer contributions for employee pension and insurance funds and employer contributions for government social insurance. The sector level wages by state are forced to the sector level control totals for both supplements to wages.

The estimates of wages and salaries are also used to produce the quarterly estimates of construction proprietors' income; contributions for government social insurance; and the residence adjustment. For construction proprietors' income the quarterly indicator is the final estimate of construction wages and salaries. For contributions for government social insurance, the final estimates of wages by NAICS sector are summed to totals by state then forced to the national control total.

Both the preliminary and the second quarterly estimates of nonfarm proprietors' income, property income, –which comprises personal dividend income; personal interest income, and rental income of persons- and personal current transfer receipts are derived from the trends in the annual state estimates, because monthly or quarterly source data are unavailable. Collectively these components account for about 39 percent of personal income.

Revised quarterly estimates.--After the second quarterly estimates are prepared, little new state-level quarterly source data become available. Therefore, the initial approximations of the revised quarterly estimates incorporate quarterly source data that are generally the same as the data used for the second quarterly estimates. The revised estimates differ from the second estimates mainly in their adjustment for consistency with revised national quarterly estimates and state annual estimates.

The revised quarterly estimates are prepared with the dual allocation procedure./6/ First, the state annual estimates for the component are allocated to quarters in proportion to the initial approximations, and second, the quarterly national control totals are allocated to states in proportion the output of the first step.

Control totals for the quarterly estimates

The quarterly national control totals are mainly derived from the estimates of personal income in the national income and product accounts (NIPA's). The control totals for most components of state personal income are consistent with the NIPA estimates of these components./7/

The national control totals for the years for which detailed annual state estimates have been prepared are derived from the interpolation of the national control totals of the revised annual state estimates; the quarterly NIPA estimates are used as the indicator series for the interpolation. For most components of personal income, the control totals for the fourth quarter of the last year in the revised annual series are then extrapolated to the subsequent quarter or quarters in proportion to the quarterly NIPA estimates.

In March, however, source data for wages and salaries and farm proprietors' income that were not available when the NIPA estimates were prepared are sometimes used in the preparation of the control totals for the state estimates of wages and salaries and farm proprietors' income./8/

Control totals for the quarterly estimates of wages and salaries.--Each March, the following BEA estimates of wage and salary disbursements for the most recent year are compared: The annual NIPA estimates and an alternative annual estimate that is based primarily on BLS tabulations of wages and salaries of employees covered by unemployment insurance for the first three quarters and on a BEA estimate for the fourth quarter./9/ If the two

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6. See "Dual allocation" in the "Technical Notes."
7. The estimates of personal income in the NIPA's differ from the national totals of state personal income because of differences coverage, in the methodologies used to produce the estimates, and in the timing of the availability of the source data. See "Differences in definitions and classifications" in the "Overview."
8. The difference in the availability of the data for the estimates of wages and salaries is especially important because the revision to the national control totals of wages and salaries that are used in the preparation of the state estimates of wages and salaries in April sometimes foreshadows the direction and size of the revision to the NIPA estimates in July.

9. The CES survey collects data for the total number of jobs and for the average weekly hours and average hourly earnings of production and nonsupervisory workers. This survey of nearly

series for the sum of all industries do not differ significantly, the NIPA estimates of wage and salary disbursements are used to prepare the control totals for the state estimates. If the two series do differ significantly, the national control totals are derived for each industry using the alternative annual estimates.

Control totals for the quarterly estimates of farm proprietors' income.-- For the preliminary and second state quarterly estimates, an annual estimate of farm proprietors' income for the current year is derived using U.S. farm income estimates from the U.S. Department of Agriculture (USDA). Each March, newly available annual state and revised national data from the USDA is incorporated into this annual estimate. The NIPA estimates are used as the indicator series in the derivation of the quarterly control totals.

Sources and methods for three components and for the residence adjustment

The specific methods used to prepare the quarterly state estimates of three components of personal income--wage and salary disbursements, farm proprietors' income, and personal current transfer receipts--and for the estimates of the residence adjustment are described in this section.

Wage and salary disbursements.--The preliminary quarterly state estimates of wages and salaries for most industries at the NAICS sector level are extrapolated from the estimates for the previous quarter by state data for employment from the CES. The second quarterly estimates for these industries incorporate the state payroll data (known as ES-202 data) that are compiled in the administration of the state unemployment insurance system. These data are a substantially better source for the state estimates than the CES data, so the incorporation of

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400,000 nonagricultural establishments is conducted by the state employment security agencies and coordinated by the Bureau of Labor Statistics.

  The data are collected on form BLS 790 for the pay period that includes the 12th day of the month; the data are released 1 week after the end of the month and are reconciled annually with the ES-202 data. The data for average hourly earnings exclude bonus payments and several other forms of wages and salaries.

these data accounts for the most important differences between the preliminary estimates and the second estimates of quarterly state personal income.

For the wage and salary disbursements of farms and the military reserves, both the preliminary and the second quarterly estimates are based on trend extrapolation from the annual estimates.

For the wage and salary disbursements of railroads and of the Federal government, both the preliminary and the second quarterly estimates are extrapolated from the previous quarter by employment data. For railroads and for most of the active duty military services, average wage data are also used (see table J).

Farm proprietors' income.-- In deriving the quarterly state estimates of farm proprietors' income, first annual state estimates are derived for the current year using available data from the USDA. Then, quarterly estimates are derived from these annual estimates and the quarterly national controls in three parts using the dual allocation procedure: Farm subsidies; farm proprietors' income excluding subsidies; and special adjustments for unusual occurrences, such as natural disasters./10/

The quarterly indicator series for the estimates of the subsidies are based on trend interpolation of the derived annual estimates. The quarterly indicator series for the estimates of farm proprietors' income excluding subsidies are interpolated from the derived annual estimates by monthly USDA data on cash receipts from the sale of farm products. The estimates of the special adjustments are based on state-level information from the USDA.

Transfer payments.--The quarterly estimates of transfer payments are prepared as the sum of the state unemployment insurance (UI) benefits and of all other transfer payments. The quarterly estimates of state UI benefits are interpolated and extrapolated from the annual estimates by state-level data for the benefits from the Employment and Training Administration of the Department of Labor. The quarterly estimates for all other transfer payments are based on trend interpolation and extrapolation of the annual estimates.

Residence adjustment.--The quarterly state estimates of the residence adjustment are calculated by summing estimates of the interstate gross flows: The outflows from each state are subtracted from the inflows to the state./11/ The quarterly state estimates of the interstate gross flows are derived from the gross flows of interstate commuters' wages and salaries, other labor income, and personal contributions for social insurance that were calculated in the derivation of the annual state estimates. Each annual gross flow is interpolated and extrapolated to quarters by the quarterly estimates of the corresponding income component for the state of work.

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10. See "Dual allocation" in the "Technical Notes."

11. Each gross flow is an inflow to the state of the residence and an outflow from the state of work.

For the methodology for the annual estimates, see the section "Residence Adjustments" in the methodology for the annual estimates.